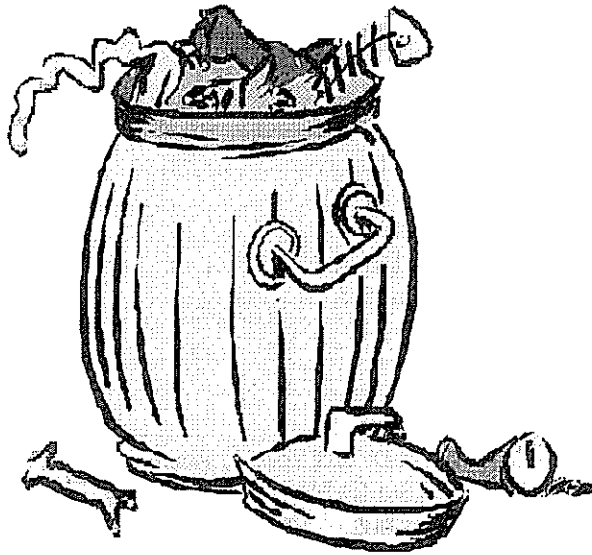


# 1999 WASTE STREAM ANALYSIS

## FINAL REPORT



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### Glossary

A **Technical Appendix** was also prepared for this project, and it contains additional data and more detailed information on the procedures used for conducting this study.

**About the cover** - the cover of this report shows a representative sample of Clark County garbage. The white lines divide the picture just as a pie chart would, showing the relative amount (by weight) of each material. Inside each "slice" of the pie chart, an amount of material has been placed that represents an average 100-pound sample of Clark County garbage (such as 14.5 pounds of food waste to represent the 14.5% of the waste stream that food waste makes up). The materials for this picture were gathered from loads of waste discarded at the Central Transfer and Recycling Center.

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**\*THIS REPORT IS PRINTED ON PAPER THAT WAS RETRIEVED FROM A LOAD OF GARBAGE**

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# SECTION I INTRODUCTION

## A. OBJECTIVES

This study examined the quantity and composition of the solid waste (garbage) discarded by homes and businesses in Clark County in 1999. The primary purpose of the study was to collect data on the amount of recyclable materials in the County's waste stream. This data allows an examination to be made of the effectiveness of the County's existing waste reduction and recycling programs. The results of this study will also help identify future waste reduction and recycling program needs and modifications. In addition, this report complies with a provision of the contract with Columbia Resource Company (CRC) that requires a waste stream analysis to be periodically performed at the transfer stations. This is the third such study that has been conducted, and previous studies were performed in 1993 and 1995.

This study was conducted by the environmental consulting firm of Green Solutions under contract to Clark County. The sorting was carried out by crews provided by the Clark County Sheriff's Department.

## B. BACKGROUND

In April 1990, Clark County entered into a 20-year contract with Columbia Resource Company (CRC). This contract obligated CRC to provide a waste disposal system that would begin operating January 1, 1992. This system was designed to recycle a portion of the incoming waste stream and then export the remaining wastes to an out-of-county landfill.

The solid waste disposal system operated by CRC consists of two transfer and recycling facilities; the Central Transfer and Recycling Center (CTR) and the West Van Material Recovery Center (West Van). CRC employees at these facilities recover certain recyclable materials (including wood, cardboard, metal and rubble) and household hazardous wastes. West Van also processes source-separated recyclable materials from curbside and commercial programs. Non-recycled waste is compacted, containerized, placed on barges and shipped to the Finley Buttes Landfill located in Morrow County, Oregon.

## C. OVERVIEW

The County's waste stream was divided into five groups (waste generators) for the purposes of quantification and characterization. These groups are:

- **Single-Family Homes** (waste brought in by garbage haulers from single-family homes)
- **Apartments** (waste brought in by garbage haulers from apartment buildings and mobile home parks)
- **Residential Self-Haul** (waste brought in by homeowners and renters from residential sources)
- **Non-Residential Self-Haul** (waste brought in by an employee from businesses or contractors)
- **Businesses** (waste brought in by garbage haulers from commercial, industrial, and institutional sources)

This study only examined solid waste delivered to the two transfer stations. The results of this study do not include:

- recyclable materials collected in curbside recycling programs, at drop-off centers or other source-separated materials removed by generators prior to disposal.
- solid waste disposed at sites outside of the County, such as medical wastes, and the portion of inert and construction wastes that are disposed at sites other than the Clark County transfer stations.
- certain special wastes, such as ash, aluminum smelter waste, and contaminated soils, that are delivered to the transfer stations but that were excluded from the study by definition. Excluding these special wastes had the effect of reducing the waste stream addressed in this study by about 10,000 tons per year (from 226,869 tons to 216,500 tons per year).

It should also be noted that the waste composition results shown in this report include the quantities of materials that are recovered from the tipping floors of the transfer stations by CRC personnel. In other words, not all of the recyclable materials shown as being in the waste stream are actually being shipped out for landfilling.

More information on the definitions and procedures used can be found in the Glossary and Technical Appendix.

## SECTION II RESULTS

### A. WASTE COMPOSITION RESULTS

The composition of the County's solid waste was determined by randomly selecting (within each generator category) and sorting 398 waste samples at the two transfer stations. Sampling was conducted for eight days each quarter, for a total of 32 days during 1999. Samples were sorted into 80 different categories. The numbers of samples taken for each category of waste generator were:

<u># Samples</u>	<u>Residential Generators</u>	<u># Samples</u>	<u>Non-Residential Generators</u>
48	Single-Family Homes	100	Non-Residential Self-Haul
48	Apartments	106	Businesses
96	Residential Self-Haul		

The waste composition results for Clark County are shown in Figure 1 (page 4). As shown in this figure, the materials disposed in the largest amounts are food waste (14.5%), recyclable paper (13.3%), wood (8.5%), and non-recyclable paper (8.5%).

Additional information that was gathered during the course of this study is shown in Section III (see pages 15-18). This information includes a detailed breakdown of wood, construction and demolition wastes (C&D), and special wastes. Data on the composition of waste disposed by specific non-residential sources is also shown in Section III.

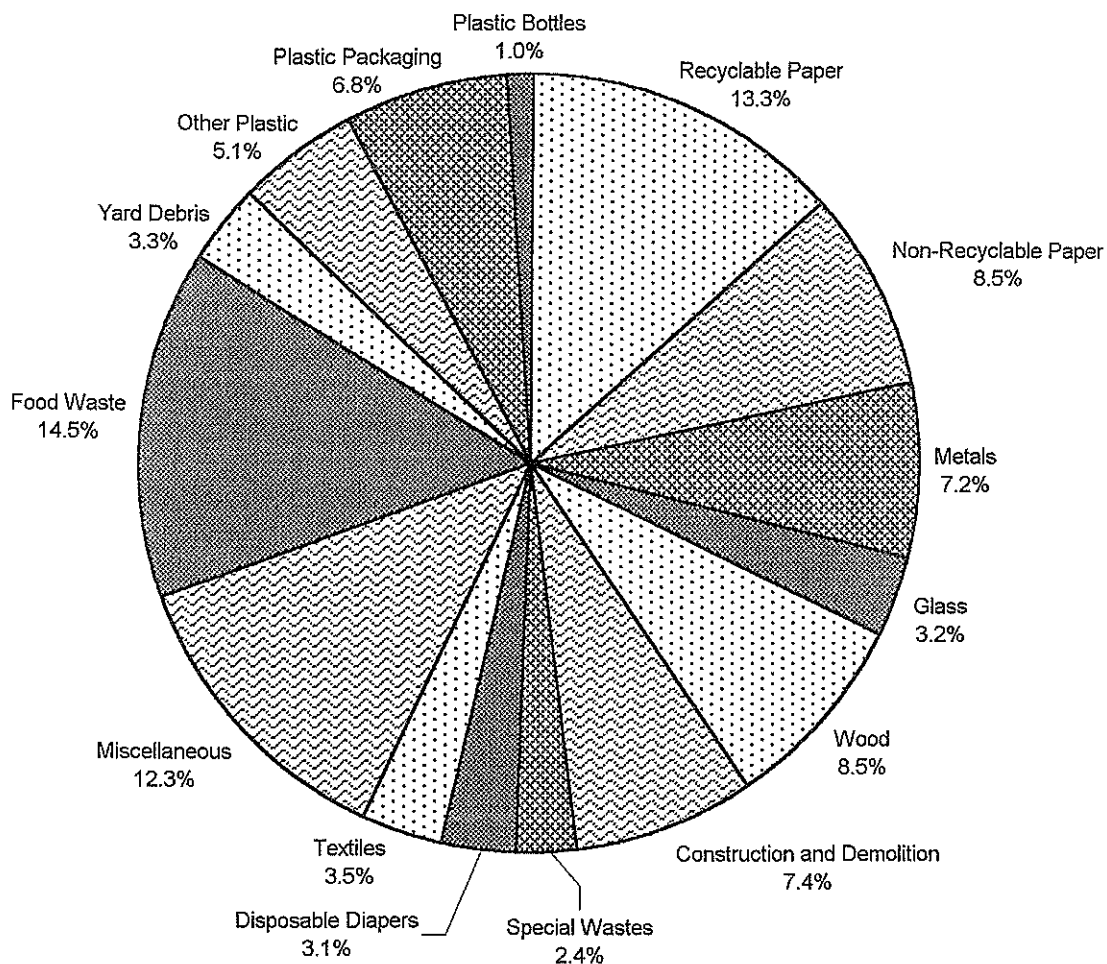
### B. WASTE QUANTITIES

The quantity (tonnage) of solid waste disposed by each generator category was determined by surveying self-haul customers at the two transfer stations for one week each quarter and by interviewing the garbage haulers. The survey of self-haul customers was conducted by scalehouse personnel (CRC employees), who used the scalehouse accounting software to code every self-haul load that was brought in for the week of the survey as either residential or non-residential. This information was then used to determine the residential/non-residential allocation for self-haul loads.

Garbage haulers were interviewed by County staff to allocate the weekly tonnages brought in by the haulers according to source (single-family homes, apartments and businesses). Combining this data with the self-haul results allowed weekly tonnages for all five waste generators to be determined, and these tonnages were then used to determine annual totals for each generator.

Table 1 and Figure 2 (see page 5) show the average percentage derived from the waste quantity surveys and the estimated annual tonnage disposed by each waste generator during 1999. For example, the 31.3% shown for single-family homes is the result of adding up the weekly tonnages measured each quarter, and then dividing this sum (5,218 tons) by the total amount of waste discarded by all generators during those same four weeks (16,655 tons). The result (31.3%) was then applied to the County's total waste stream for 1999 (216,500 tons) to determine the annual amount of waste from this source (67,800 tons).

**FIGURE 1**  
**WASTE COMPOSITION RESULTS**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**



Notes: All figures are percentage by weight. During 1999, Clark County businesses and residents discarded 216,500 tons of waste.

Recyclable paper includes newspaper (2.1%), cardboard (4.7%), office and computer paper (0.9%), mixed waste paper (4.2%), magazines (1.1%), and milk cartons (0.2%).

Glass includes the three colors of recyclable glass bottles (clear - 1.5%, brown - 0.7%, and green - 0.4%), and non-recyclable glass (0.5%).

Miscellaneous includes tires (0.3%), rubber products (0.3%), cosmetics (0.1%), carpet (2.8%), leather (0.1%), furniture (0.8%), fines (2.8%), ash and dust (0.3%), miscellaneous organics (4.4%) and miscellaneous inorganics (0.4%).

Other plastic includes other plastic products (4.3%) and expanded polystyrene (0.8%).

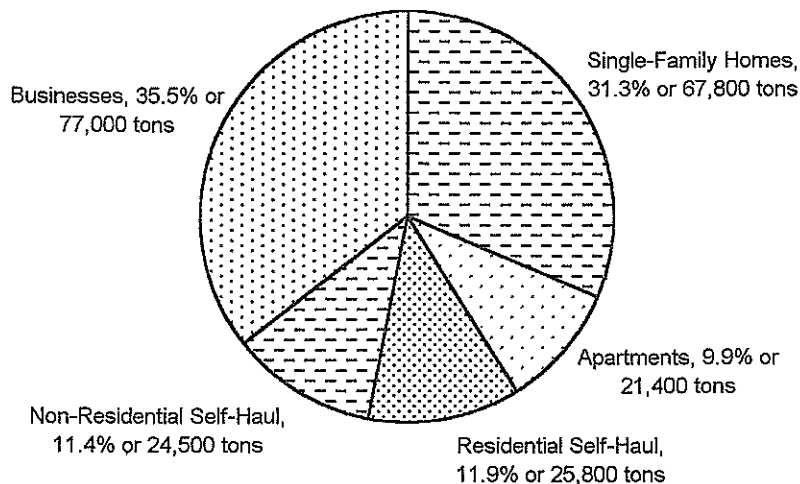
Plastic bottles include PET (0.4%), HDPE (0.5%) and types 3-7 (0.1%).

**TABLE 1**  
**QUANTITIES OF DISCARDED WASTES**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

Type of Waste Generator (Source)	Annual Results	
	Percent	Tons
Single-Family Homes	31.3%	67,800
Apartments	9.9%	21,400
Residential Self-Haul	<u>11.9%</u>	<u>25,800</u>
Residential Subtotal	53.1%	115,000
Non-Residential Self-Haul	11.4%	24,500
Businesses	<u>35.5%</u>	<u>77,000</u>
Non-Residential Subtotal	46.9%	101,500
<b>Total</b>	<b>100.0%</b>	<b>216,500</b>

Note: The figure for total tons of County waste was derived from the total amount of waste handled by the two transfer stations (226,869 tons in 1999), minus the special/industrial wastes that were excluded from this study.

**FIGURE 2**  
**QUANTITIES OF DISCARDED WASTES**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**





## C. TONS OF MATERIALS DISCARDED

The waste quantity and composition results can be combined to show the estimated total weight of discarded materials. This data is shown in Table 2 and Figure 3 on the next two pages. Note that although the figures are presented as an exact number, there is a specific degree of uncertainty associated with each figure. For instance, the total amount of aluminum cans is shown as 850 tons, but at a 90% confidence interval the actual figure could range from 628 to 1,083 tons. More information on the confidence intervals by material and generator category can be found in the Technical Appendix.

Some highlights of the information shown in Table 2 and Figure 3 include:

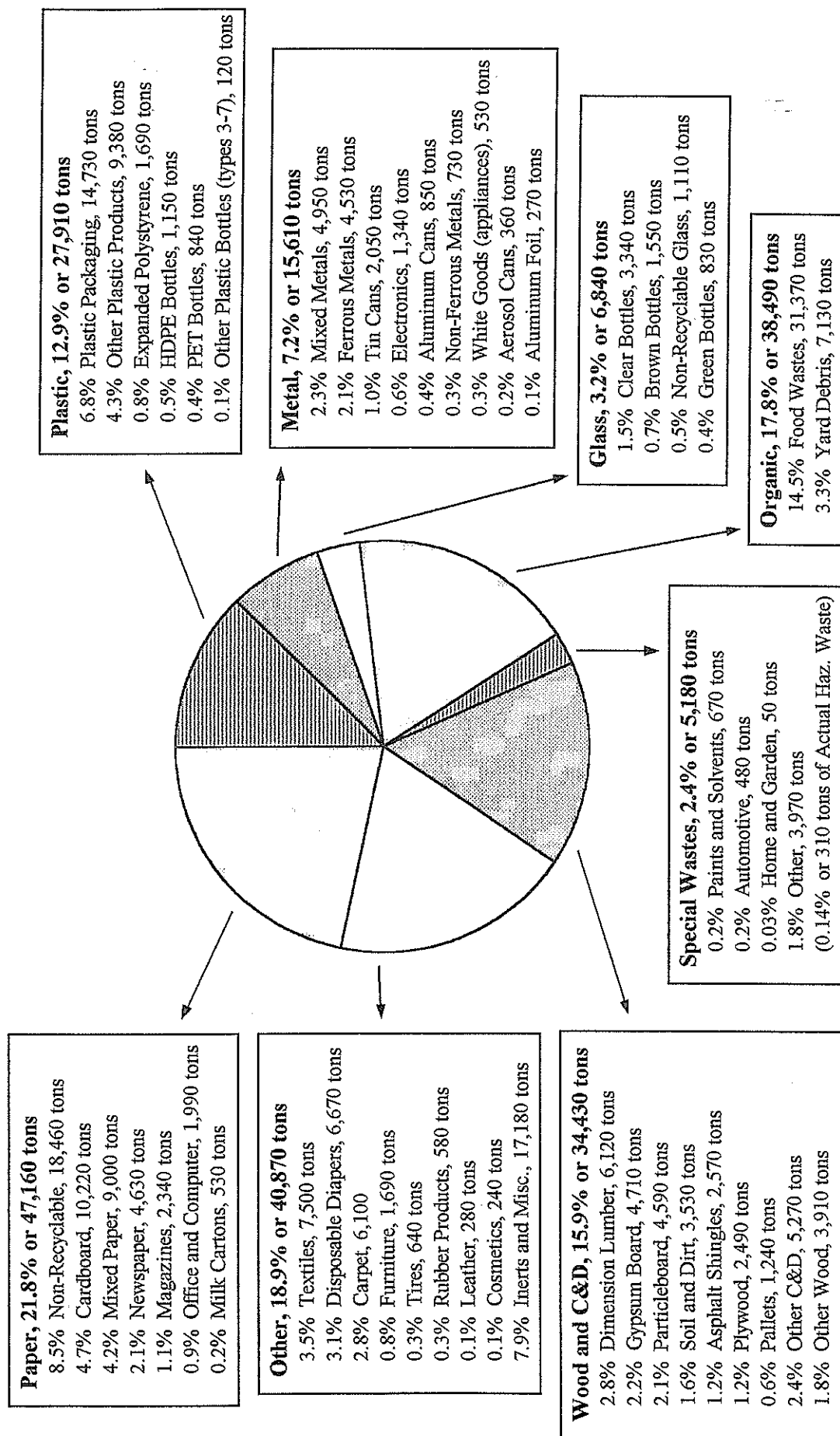
- **Paper:** There is a large amount of paper in the waste stream, and about 60% of it could be recycled in existing programs. Recyclable paper (newspaper, cardboard, office paper, mixed paper, magazines and milk cartons) represents 19% of Apartment waste, 15% of Business waste, 12% of Residential Self-Haul waste, 11% of Single-Family waste and 10% of Non-Residential Self-Haul waste. Of particular interest is the estimated 10,200 tons of cardboard are thrown away each year. Business and Non-Residential Self-Haul waste generators account for two-thirds of the total amount of cardboard discarded.
- **Plastic:** An estimated 14,700 tons of plastic packaging and 1,700 tons of expanded polystyrene were discarded in 1999. Packaging is the plastic material present in the largest quantity, making up over half of the total amount of plastics.
- **Metal:** The metals category is one of the smallest in terms of its contribution to the County's total waste stream, but this category contains some of the highest-value materials for recycling. An example of the value of the discarded metals is aluminum cans. An estimated 45 million aluminum cans were discarded by Clark County households and businesses in 1999, or more than one can per person every three days. The projected value of the discarded cans is about \$450,000 per year (valued at a penny per can).
- **Organics:** Food waste is the largest single material found in the County's waste stream, representing 14.5% of the entire waste stream or slightly more than one-half pound of food waste per person per day in Clark County. A total of 31,400 tons or 62.8 million pounds of food are discarded by homes and businesses annually.
- **Diapers:** A significant amount of diapers are discarded annually, in a quantity that is almost equal to the amount of yard debris or glass that is thrown away in Clark County each year. Slightly more than half of this material is discarded by Single-Family Homes (3,540 tons or 53% of the total). There is also a significant amount in the Business waste stream (1,180 tons), but about one-third of this is the result of local diaper manufacturers that are disposing of clean materials (rejects and residuals).
- **Textiles:** Textiles (clothing) are not only a recyclable material but can often be reused prior to being recycled or discarded. Much of the estimated 7,500 tons of textiles in the waste stream could have gone to thrift stores or rag vendors, although this study found that thrift stores were also discarding a large amount of clothing (see Table 6 on page 17).
- **Carpet:** Carpet is discarded in significant quantities (6,100 tons), especially in Business and Non-Residential Self-Haul wastes. A significant quantity of this is clean scraps from carpet distributors and installers.

**TABLE 2**  
**WASTE COMPOSITION RESULTS BY SOURCE**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

		Single-Family		Residential	Non-Res.		Average for
		<u>Homes</u>	<u>Apartments</u>	<u>Self-Haul</u>	<u>Self-Haul</u>	<u>Businesses</u>	<u>Entire County</u>
<b>PAPER</b>	Newspaper	1,620	1,160	530	130	1,190	4,630
	Cardboard	1,090	1,090	1,220	1,730	5,080	10,220
	Office and Computer	400	160	72	48	1,320	1,990
	Mixed Waste Paper	3,110	1,220	810	330	3,530	9,000
	Magazines	940	310	430	40	620	2,340
	Milk Cartons, Other	210	51	26	72	170	530
	Non-Recyclable Paper	6,590	1,590	1,260	1,620	7,390	18,460
	<b>Paper Subtotal</b>	<b>13,960</b>	<b>5,580</b>	<b>4,340</b>	<b>3,980</b>	<b>19,300</b>	<b>47,160</b>
<b>PLASTIC</b>	PET Bottles	360	150	91	41	200	840
	HDPE Bottles	490	210	140	19	290	1,150
	Bottles 3-7	85	11	13	1	14	120
	Plastic Packaging	5,530	1,180	1,010	790	6,230	14,730
	Other Plastic Products	1,560	520	1,320	920	5,060	9,380
	Expanded Polystyrene	330	81	75	180	1,020	1,690
	<b>Plastic Subtotal</b>	<b>8,350</b>	<b>2,150</b>	<b>2,650</b>	<b>1,950</b>	<b>12,810</b>	<b>27,910</b>
<b>METAL</b>	Aluminum Cans	300	180	100	41	220	850
	Aluminum Foil	140	38	30	4	57	270
	Tin Cans	1,070	320	260	31	370	2,050
	Mixed Metals	880	360	1,450	650	1,620	4,950
	Ferrous Metals	580	310	880	1,200	1,560	4,530
	White Goods	0	240	0	290	0	530
	Non-Ferrous Metals	74	76	100	170	310	730
	Aerosol Cans	190	39	39	8	81	360
<b>ORGANIC</b>	Electronics	150	81	380	5	730	1,340
	<b>Metal Subtotal</b>	<b>3,380</b>	<b>1,660</b>	<b>3,230</b>	<b>2,400</b>	<b>4,940</b>	<b>15,610</b>
	Food Waste	14,570	3,170	2,690	500	10,440	31,370
	Yard Debris	2,970	670	450	440	2,600	7,130
	<b>Organic Subtotal</b>	<b>17,540</b>	<b>3,840</b>	<b>3,140</b>	<b>940</b>	<b>13,030</b>	<b>38,490</b>
<b>GLASS</b>	Clear Bottles	1,310	560	600	100	770	3,340
	Brown Bottles	350	370	370	110	350	1,550
	Green Bottles	340	170	110	30	190	830
	Non-Recyclable Glass	360	130	220	230	170	1,110
<b>OTHER WASTES</b>	<b>Glass Subtotal</b>	<b>2,360</b>	<b>1,230</b>	<b>1,310</b>	<b>480</b>	<b>1,460</b>	<b>6,840</b>
	Tires	24	140	140	1	330	640
	Rubber Products	91	22	66	34	370	580
	Cosmetics	110	45	38	1	47	240
	Disposable Diapers	3,540	980	940	20	1,180	6,670
	Textiles	2,200	960	1,210	450	2,680	7,500
	Carpet	200	410	1,090	2,340	2,060	6,100
	Leather	120	49	18	4	89	280
<b>WOOD and C&amp;D</b>	Furniture	0	740	300	180	490	1,690
	Fines	2,970	650	290	500	1,560	5,960
	Ash, Dust	460	91	92	5	82	730
	Misc. Organics	5,420	1,130	550	380	2,130	9,610
	Misc. Inorganics	180	87	300	38	280	880
	<b>Other Subtotal</b>	<b>15,310</b>	<b>5,290</b>	<b>5,020</b>	<b>3,960</b>	<b>11,290</b>	<b>40,870</b>
	Wood	1,850	660	2,900	5,320	7,610	18,350
	C&D	2,410	420	2,070	5,330	5,870	16,090
<b>SPECIAL WASTES</b>	<b>Wood, C&amp;D Subtotal</b>	<b>4,260</b>	<b>1,080</b>	<b>4,970</b>	<b>10,650</b>	<b>13,480</b>	<b>34,440</b>
	Paints and Solvents	58	110	330	37	140	670
	Automotive	190	54	76	87	71	480
	Home and Garden	9	1	42	0	0	50
	Other	2,410	390	650	57	470	3,970
	(Actual Hazardous Waste)	65	60	66	82	31	310
	<b>Special Waste Subtotal</b>	<b>2,670</b>	<b>550</b>	<b>1,100</b>	<b>180</b>	<b>680</b>	<b>5,180</b>
<b>TOTALS</b>		<b>67,800</b>	<b>21,400</b>	<b>25,800</b>	<b>24,500</b>	<b>77,000</b>	<b>216,500</b>

Notes: All figures are tonnages per year, and are based on a total amount of 216,500 tons in 1999.

**FIGURE 3**  
**AMOUNT OF DISCARDED MATERIALS**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**



Note: All figures are tonnages per year, and are based on a total amount of 216,500 tons.

- **Wood and construction/demolition (C&D):** Although the majority of wood and C&D waste is taken to facilities outside of the Clark County solid waste system, wood and C&D wastes continue to make a significant contribution to the County's waste delivered to the two transfer stations. Most of these materials are in the Non-Residential Self-Haul and Business waste streams (24,100 tons, or 70% of the total of these materials). CRC is already recovering some of these materials from loads dumped at the transfer station.
- **Special wastes:** A large component of special wastes is animal excrement (3,300 tons, see Table 5 on page 16). Moderate-risk wastes, including paints, solvents, motor oil, oil filters, car batteries, pesticides, fertilizers and gas cylinders, make up 1,190 tons or 2.4 million pounds per year of this category (although only 305 tons of this is actually classified as hazardous waste by federal and state regulations). During 1998, 1.5 million pounds of moderate-risk waste was collected at the transfer stations, mobile collection events, curbside oil collection and other oil drop-off locations. This equals a 38% recycling rate for moderate-risk waste.

## D. COMPARISON TO PREVIOUS STUDIES

Table 3 (on the next page) shows data from the three studies that have been conducted by the County. This data shows several interesting trends in the percentages of various materials, although examining trends on the basis of pounds per resident or employee for each material may be a more accurate approach. To illustrate these trends for a few materials (see also Figure 4 on page 11):

- **Paper** has been decreasing steadily, from 26.1% in 1993 to 23.3% in 1995 and now to 21.8% in 1999. Only mixed waste paper has consistently decreased during this period, possibly because the recycling of this material is relatively new and has been improving (whereas recycling of other paper was already well established by 1993 and so has been more stable). The amount of non-recyclable paper has dropped also, although in this case it is probably due to changes in recycling definitions that have allowed more of this material to be shifted to the mixed waste paper category (in which case the recycling of mixed waste paper has increased even more than is apparent).
- **Food waste** is a substantial portion of the waste stream in all three studies.
- **Plastic** as a percentage of the overall waste stream has increased steadily from 10.4% in 1993 to 11.6% in 1995 to 12.9% in 1999. This trend may be due to plastic's increasing market share for packaging. The amount of PET bottles discarded has increased slightly despite recycling programs that capture this material, and this has occurred on a nationwide basis as plastic recycling programs struggle to keep up with PET's increasing use for bottles and other packaging.
- **Yard debris** is an apparent success story for composting programs that divert this material, as the amount of yard debris has dropped from 5.8% in 1993, to 4.1% in 1995 and now to 3.3%. The total tons of yard debris has also dropped, from 10,700 tons in 1993 to 8,340 tons in 1995 to 7,130 tons in 1999, despite a significant increase in population (and lawns) during that same time period.
- **Diapers** as a percentage of the overall waste stream continues to increase steadily, from 2.1% in 1993 to 2.8% in 1995 to 3.1% in 1999.

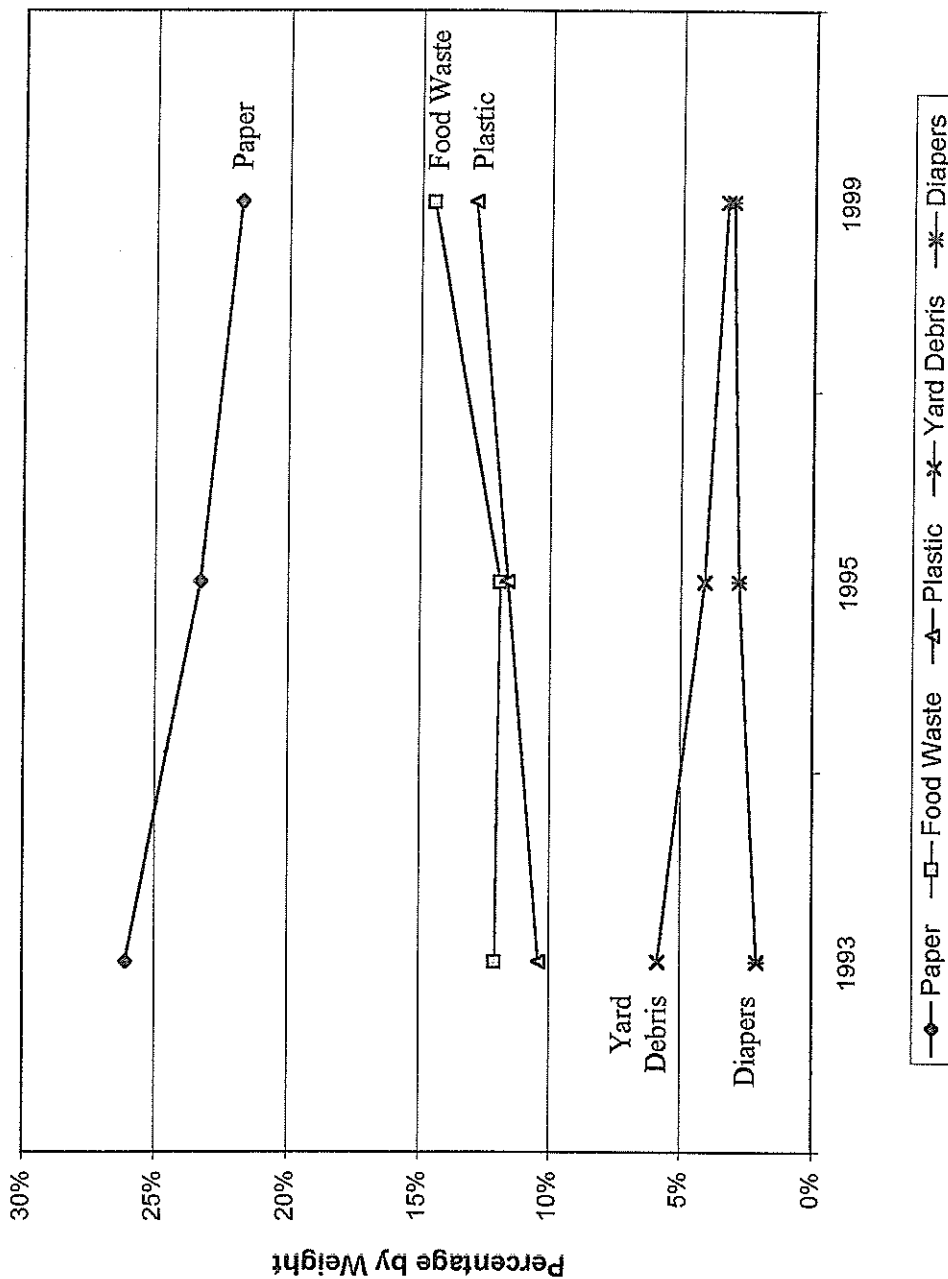
The County's waste disposal rate (total waste quantities versus population) calculated by the three studies shows that 3.72 pounds per person per year was disposed in 1993, 3.87 in 1995 and 3.52 in 1999.

**TABLE 3**  
**CURRENT AND PREVIOUS WASTE COMPOSITION RESULTS**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

		Previous Studies		Current Study,
		<u>1993</u>	<u>1995</u>	<u>1999</u>
<b>PAPER</b>	Newspaper	1.8%	2.0%	2.1%
	Corrugated Paper	4.7%	5.3%	4.7%
	Office and Computer	0.8%	1.0%	0.9%
	Mixed Waste Paper	6.6%	5.5%	4.2%
	Magazines	1.2%	1.2%	1.1%
	Milk Cartons, Other	0.2%	0.3%	0.2%
	Non-Recyclable Paper	11.0%	8.1%	8.5%
	<b>Paper Subtotal</b>	<b>26.1%</b>	<b>23.3%</b>	<b>21.8%</b>
<b>PLASTIC</b>	PET Bottles	0.2%	0.4%	0.4%
	HDPE Bottles	0.6%	0.7%	0.5%
	Bottles 3-7	0.1%	0.1%	0.1%
	Plastic Packaging	3.7%	6.7%	6.8%
	Other Plastic Products (1)	5.5%	3.1%	4.3%
	Expanded Polystyrene	0.3%	0.6%	0.8%
	<b>Plastic Subtotal</b>	<b>10.4%</b>	<b>11.6%</b>	<b>12.9%</b>
<b>METAL</b>	Aluminum Cans	0.4%	0.4%	0.4%
	Aluminum Containers	0.1%	0.1%	0.1%
	Tin Cans	0.9%	1.1%	0.9%
	Mixed Metals/Materials (2)	2.1%	1.6%	2.9%
	Ferrous Metals	2.1%	2.4%	2.1%
	White Goods	0.3%	0.6%	0.2%
	Non-Ferrous Metals	0.2%	0.3%	0.3%
	Aerosol Cans (3)	NA	0.1%	0.2%
	<b>Metal Subtotal</b>	<b>6.1%</b>	<b>6.6%</b>	<b>7.2%</b>
<b>GLASS</b>	Clear Bottles	1.4%	1.4%	1.5%
	Brown Bottles	0.4%	0.4%	0.7%
	Green Bottles	0.3%	0.4%	0.4%
	Non-Recyclable Glass	0.6%	0.5%	0.5%
	<b>Glass Subtotal</b>	<b>2.7%</b>	<b>2.7%</b>	<b>3.2%</b>
<b>ORGANIC</b>	Food Wastes	12.1%	11.9%	14.5%
	Yard Debris	5.8%	4.1%	3.3%
	<b>Organic Subtotal</b>	<b>17.9%</b>	<b>16.0%</b>	<b>17.8%</b>
<b>OTHER</b>	Tires	0.1%	0.3%	0.3%
	Rubber Products	0.6%	0.3%	0.3%
	Disposable Diapers	2.1%	2.8%	3.1%
	Textiles	4.6%	5.7%	3.5%
	Carpet (4)	NA	NA	2.8%
	Leather	0.0%	0.1%	0.1%
	Furniture	0.5%	1.3%	0.8%
	Fines	2.4%	3.3%	2.8%
	Ash	0.2%	0.3%	0.3%
	Misc. Organics	5.6%	5.9%	4.4%
	Misc. Inorganics	NA	0.1%	0.4%
	Special Wastes	1.8%	1.5%	2.4%
	<b>Other Waste Subtotal</b>	<b>17.9%</b>	<b>21.5%</b>	<b>21.3%</b>
<b>WOOD and C&amp;D</b>	Wood Wastes	10.5%	9.4%	8.5%
	Construction/Demolition	8.4%	8.9%	7.4%
	<b>C&amp;D Subtotal</b>	<b>18.9%</b>	<b>18.3%</b>	<b>15.9%</b>

Notes: 1. Rigid Polystyrene, measured in the two previous studies, was added to Other Plastic Products for the current study.  
2. Electronics (measured only in the current study) was added to Mixed Metals for results comparable to the previous studies.  
3. Aerosol Cans were not measured in the 1993 study.  
4. Carpet was combined with Textiles in the previous studies.  
All figures are percentages by weight.

**FIGURE 4**  
**HISTORICAL TRENDS FOR SELECT MATERIALS**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**



## **E. COMPARISON TO OTHER COUNTIES**

Data from the current study can also be compared to waste characterization studies recently conducted for Thurston and Snohomish Counties (see Table 4 on the next page). The fieldwork for Thurston County was conducted in 1999, on a schedule very similar to Clark County's study. The fieldwork for Snohomish County was conducted in October 1997 and May 1998. The results for all three counties are surprisingly similar. Previous such comparisons have not appeared as close, leading to the thought that perhaps local differences in waste management programs have begun to even out, at least in these three areas. Consistency of definitions and procedures have likely also helped to bring out these similarities, since all of three of these studies were conducted by the same consulting firm.

**TABLE 4**  
**COMPARISON OF RESULTS TO OTHER COUNTIES**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

		Results from Other Counties		
		Thurston Co.	Snohomish Co.	Clark County
		<u>1999</u>	<u>1998</u>	<u>1999</u>
<b>PAPER</b>	Newspaper	1.82%	1.86%	2.14%
	Cardboard	3.68%	4.04%	4.72%
	Office and Computer	0.49%	0.80%	0.92%
	Mixed Waste Paper	4.02%	5.30%	4.16%
	Magazines	1.38%	0.80%	1.08%
	Milk Cartons, Other	0.30%	0.39%	0.24%
	Non-Recyclable Paper	8.74%	8.69%	8.52%
	<b>Paper Subtotal</b>	<b>20.43%</b>	<b>21.87%</b>	<b>21.78%</b>
<b>PLASTIC</b>	PET Bottles	0.52%	0.45%	0.39%
	HDPE Bottles	0.68%	0.63%	0.53%
	Bottles 3-7	0.05%	0.12%	0.06%
	Plastic Packaging	7.24%	7.47%	6.80%
	Other Plastic Products	3.74%	3.45%	4.33%
	Expanded Polystyrene	0.46%	0.66%	0.78%
	<b>Plastic Subtotal</b>	<b>12.69%</b>	<b>12.78%</b>	<b>12.89%</b>
<b>METAL</b>	Aluminum Cans	0.42%	0.52%	0.39%
	Aluminum Foil	0.13%	0.17%	0.12%
	Tin Cans	1.00%	1.06%	0.95%
	Mixed Metals	2.58%	1.79%	2.29%
	Ferrous Metals	2.69%	2.36%	2.09%
	White Goods	0.71%	0.01%	0.25%
	Non-Ferrous Metals	0.18%	0.46%	0.34%
	Aerosol Cans	0.20%	0.20%	0.17%
	Electronics	NA	NA	0.62%
	<b>Metal Subtotal</b>	<b>7.91%</b>	<b>6.58%</b>	<b>7.21%</b>
<b>ORGANIC</b>	Food Waste	15.46%	13.26%	14.49%
	Yard Debris	3.04%	2.51%	3.29%
	<b>Organic Subtotal</b>	<b>18.50%</b>	<b>15.78%</b>	<b>17.78%</b>
<b>GLASS</b>	Clear Bottles	1.74%	1.63%	1.54%
	Brown Bottles	0.73%	0.64%	0.72%
	Green Bottles	0.45%	0.38%	0.39%
	Non-Recyclable Glass	1.03%	0.73%	0.51%
	<b>Glass Subtotal</b>	<b>3.94%</b>	<b>3.38%</b>	<b>3.16%</b>
<b>OTHER WASTES</b>	Tires	0.16%	0.12%	0.30%
	Rubber Products	0.35%	0.23%	0.27%
	Cosmetics	0.14%	0.07%	0.11%
	Disposable Diapers	2.11%	2.66%	3.08%
	Textiles	2.57%	2.39%	3.47%
	Carpet	2.51%	2.61%	2.82%
	Leather	0.03%	0.09%	0.13%
	Furniture	1.02%	0.83%	0.78%
	Fines	2.29%	3.64%	2.75%
	Ash, Dust	0.26%	1.54%	0.34%
	Misc. Organics	4.34%	5.21%	4.44%
	Misc. Inorganics	0.59%	0.39%	0.41%
	<b>Other Subtotal</b>	<b>16.36%</b>	<b>19.79%</b>	<b>18.88%</b>
<b>WOOD and C&amp;D</b>	Wood	10.86%	11.26%	8.48%
	C&D	6.88%	6.29%	7.43%
	<b>Wood, C&amp;D Subtotal</b>	<b>17.73%</b>	<b>17.55%</b>	<b>15.91%</b>
<b>SPECIAL WASTES</b>		<b>2.43%</b>	<b>2.27%</b>	<b>2.39%</b>
<b>TOTALS</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>TOTAL WASTE STREAM, tons</b>		<b>144,500 TPY (1999)</b>	<b>378,800 TPY (97-98)</b>	<b>216,500 TPY (1999)</b>

Notes: All figures are percentages by weight, except last row of figures which is tons per year (TPY) for year that study was conducted.



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## **SECTION III ADDITIONAL DATA**

### **A. INTRODUCTION**

During the fieldwork for this study, additional data was collected on:

- the breakdown of wood waste, construction and demolition wastes, and special wastes.
- the composition of waste disposed by schools and specific types of businesses.

This data is presented here in a separate section of the report for several reasons, but primarily because it lacks the same level of statistical certainty as the primary results of this study.

### **B. BREAKDOWN OF WOOD, C&D, AND SPECIAL WASTES**

Additional information on the breakdown of wood, construction and demolition wastes, and special wastes is shown in Table 5 (on the following page). The figures for some of the materials, those that were found consistently and in significant quantities, may have a good degree of statistical certainty, but in general this data does not have the same degree of statistical certainty as the primary results of the study (see the Technical Appendix for more information). This data could still be used, however, to facilitate future program planning that may focus on these types of wastes.

### **C. COMPOSITION DATA FOR SPECIFIC NON-RESIDENTIAL GENERATORS**

During the course of this study, waste samples were sorted from a number of specific sources that are of general interest. These samples, which are also included in the average results for the Non-Residential Self-Haul and Business waste streams, are from the following businesses and institutions:

- Retail Stores
- Grocery Stores
- Schools (elementary and high school)
- Thrift Stores
- Construction, including subcategories for construction of new homes, roofing projects and all construction samples taken together.

The waste composition data for these generators is shown in Table 6 (on page 17). The number of samples for each generator is provided at the bottom of the table to indicate the reliability of the results. For instance, the results for Retail Stores are based on 5 samples from a variety of locations and from different times of year, hence these results provide a relatively accurate assessment of the composition of waste from this source. The data for Thrift Stores, however, is based on only 3 samples taken in the same quarter, so these results are considered to be less reliable or representative.

**TABLE 5**  
**BREAKDOWN OF WOOD, C&D AND SPECIAL WASTES**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

	<u>Single-Family Homes</u>	<u>Apartments</u>	<u>Residential Self-Haul</u>	<u>Non-Res. Self-Haul</u>	<u>Businesses</u>	<u>Average for Entire County</u>
<b>WOOD WASTE</b>						
Dimension Lumber	540	180	580	2,040	2,780	6,120
Pallets, Crates	0	0	0	400	840	1,240
Treated Wood	0	4	71	130	220	420
Roofing	0	0	130	22	0	150
Contaminated	0	15	110	270	22	420
Stumps, Other Bulky Wood	0	19	320	19	56	410
Plywood	780	13	100	430	1,170	2,490
Particleboard, Fiberboard	150	240	1,130	1,530	1,540	4,590
Wood Products	320	170	360	60	700	1,610
Other Wood	55	21	100	440	280	900
<b>Total Wood Waste</b>	<b>1,850</b>	<b>660</b>	<b>2,900</b>	<b>5,320</b>	<b>7,610</b>	<b>18,350</b>
<b>CONSTRUCTION AND DEMOLITION (C&amp;D) WASTE</b>						
Ceramics, Porcelain, China	110	71	84	53	190	510
Rocks, Bricks	95	36	92	120	150	490
Concrete	390	28	250	330	450	1,450
Soil, Dirt, Fines	1,260	260	370	3	1,640	3,530
Gypsum Board	160	1	440	2,510	1,600	4,710
Fiberglass Insulation	10	0	17	88	530	640
Other Fiberglass	0	0	2	0	2	4
Roofing	360	3	600	1,400	210	2,570
Asphalt	0	0	11	79	95	180
Other C&D	17	18	200	750	1,010	1,990
<b>Total C&amp;D Waste</b>	<b>2,410</b>	<b>420</b>	<b>2,070</b>	<b>5,330</b>	<b>5,870</b>	<b>16,080</b>
<b>SPECIAL WASTES</b>						
<b>Paints and Solvents;</b>						
Latex Paint	49	29	280	17	86	460
Oil-Based Paint	3	74	43	17	54	190
Solvents	5	2	9	3	0	20
<b>Automotive Wastes;</b>						
Motor Oil, Other Oils	0	52	23	12	22	110
Oil Filters	150	0	46	18	42	260
Gasoline, Fuel Oil	2	0	0	0	2	4
Antifreeze	39	2	1	0	0	42
Other Auto Maintenance	0	0	7	0	0	7
Batteries, Car	0	0	0	57	5	61
<b>Home and Garden;</b>						
Pesticides, Herbicides	0	1	1	0	0	2
Fertilizer w/Pest. and Herb.	0	0	11	0	0	11
Fertilizer w/o Pest., Herb.	9	0	30	0	0	39
<b>Other;</b>						
Adhesives, Glues	36	4	85	16	2	140
Cleaners, Corrosives	25	3	46	0	6	80
Medical Wastes	36	14	8	0	50	110
Household Batteries	100	19	24	8	61	210
Animal Excrement	2,190	330	430	25	310	3,290
Animal Carcasses	2	21	1	5	0	29
Gas Cylinders	15	2	22	2	0	40
Other Special Wastes	1	0	30	1	36	69
<b>Total Special Waste</b>	<b>2,670</b>	<b>550</b>	<b>1,100</b>	<b>180</b>	<b>680</b>	<b>5,180</b>
<b>Subtotal, Actual Haz. Waste</b>	<b>65</b>	<b>60</b>	<b>66</b>	<b>82</b>	<b>31</b>	<b>310</b>

Note: All figures are tonnages per year, and are based on a total amount of 216,500 tons.

**TABLE 6**  
**SELECT NON-RESIDENTIAL GENERATORS**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

						<u>Construction and Demolition Waste</u>		
		<u>Retail</u>	<u>Grocery</u>		<u>Thrift</u>	<u>New</u>		<u>All</u>
		<u>Stores</u>	<u>Stores</u>	<u>Schools</u>	<u>Stores</u>	<u>Homes</u>	<u>Roofing</u>	<u>Construction</u>
<b>PAPER</b>	Newspaper	0.1%	1.8%	0.5%	0.1%	0.8%	0.4%	0.4%
	Cardboard	25.2%	3.9%	4.4%	9.0%	6.5%	2.1%	8.1%
	Office and Computer	0.5%	0.5%	1.9%	0.0%	0.2%	0.1%	0.1%
	Mixed Waste Paper	3.3%	2.0%	7.9%	12.0%	1.2%	0.4%	0.8%
	Magazines	0.0%	0.1%	0.2%	0.2%	0.1%	0.2%	0.1%
	Milk Cartons, Other	0.0%	0.2%	5.0%	0.0%	0.0%	0.0%	0.0%
	Non-Recyclable Paper	11.1%	10.5%	19.0%	5.1%	7.3%	2.3%	5.7%
	<b>Paper Subtotal</b>	<b>40.2%</b>	<b>18.9%</b>	<b>39.0%</b>	<b>26.3%</b>	<b>16.2%</b>	<b>5.4%</b>	<b>15.1%</b>
<b>PLASTIC</b>	PET Bottles	0.0%	0.0%	1.3%	0.0%	0.1%	0.1%	0.1%
	HDPE Bottles	0.2%	0.4%	0.3%	0.0%	0.0%	0.1%	0.0%
	Bottles 3-7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Plastic Packaging	9.0%	9.2%	10.1%	1.1%	2.7%	0.8%	2.5%
	Plastic Products	1.3%	0.1%	1.2%	17.2%	5.7%	2.6%	4.7%
	Expanded Polystyrene	0.5%	0.7%	0.8%	0.0%	3.1%	0.0%	0.8%
	<b>Plastic Subtotal</b>	<b>11.0%</b>	<b>10.4%</b>	<b>13.7%</b>	<b>18.3%</b>	<b>11.7%</b>	<b>3.6%</b>	<b>8.2%</b>
<b>METAL</b>	Aluminum Cans	0.0%	0.1%	1.1%	0.0%	0.1%	0.0%	0.1%
	Aluminum Foil	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
	Tin Cans	0.1%	0.2%	0.5%	0.0%	0.0%	0.0%	0.1%
	Mixed Metals	0.0%	3.0%	3.4%	10.9%	2.0%	0.7%	2.9%
	Ferrous Metals	2.2%	6.4%	1.3%	1.4%	2.8%	19.1%	4.8%
	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
	Non-Ferrous Metals	0.1%	0.0%	0.0%	0.3%	0.4%	0.0%	0.9%
	Aerosol Cans	0.2%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%
	Electronics	0.0%	0.0%	0.0%	0.4%	0.0%	0.1%	0.0%
	<b>Metal Subtotal</b>	<b>2.8%</b>	<b>9.8%</b>	<b>6.6%</b>	<b>13.1%</b>	<b>5.4%</b>	<b>19.9%</b>	<b>9.0%</b>
<b>GLASS</b>	Clear Bottles	0.1%	0.4%	3.2%	0.0%	0.2%	0.1%	0.2%
	Brown Bottles	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.5%
	Green Bottles	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
	Non-Recyclable Glass	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	1.0%
	<b>Glass Subtotal</b>	<b>0.1%</b>	<b>0.6%</b>	<b>3.3%</b>	<b>1.1%</b>	<b>0.3%</b>	<b>0.1%</b>	<b>1.7%</b>
<b>ORGANIC</b>	Food Waste	42.7%	47.6%	18.6%	0.0%	0.8%	0.2%	0.6%
	Yard Debris	0.0%	1.2%	1.3%	0.0%	0.0%	0.1%	1.9%
	<b>Organics Subtotal</b>	<b>42.7%</b>	<b>48.8%</b>	<b>19.9%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>0.3%</b>	<b>2.6%</b>
<b>OTHER WASTE</b>	Tires	0.2%	0.0%	0.0%	0.0%	0.8%	0.1%	0.2%
	Rubber Products	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%
	Cosmetics	0.3%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%
	Disposable Diapers	0.0%	0.0%	0.3%	0.0%	0.1%	0.0%	0.1%
	Textiles	0.0%	0.0%	0.8%	28.8%	1.3%	0.3%	2.3%
	Carpeting	0.0%	0.0%	3.0%	1.6%	0.7%	0.0%	9.0%
	Leather	0.0%	0.0%	0.1%	2.9%	0.0%	0.0%	0.0%
	Furniture	0.0%	0.0%	2.7%	0.0%	2.5%	0.0%	0.7%
	Fines	0.5%	0.3%	2.3%	0.3%	1.9%	0.8%	2.2%
	Ash, Dust	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Misc. Organics	0.7%	0.9%	5.3%	0.7%	1.3%	0.6%	1.4%
	Misc. Inorganics	0.0%	0.2%	0.1%	3.3%	0.5%	0.0%	0.3%
	Special Wastes	0.0%	0.0%	0.1%	0.0%	1.8%	0.2%	0.8%
	<b>Other Subtotal</b>	<b>1.7%</b>	<b>1.8%</b>	<b>14.9%</b>	<b>37.8%</b>	<b>11.0%</b>	<b>2.0%</b>	<b>16.9%</b>
<b>WOOD, C&amp;D</b>	Wood	1.2%	8.9%	2.6%	3.4%	32.2%	13.9%	21.5%
	Const./Demo. Wastes	0.3%	0.9%	0.0%	0.0%	22.4%	54.9%	25.0%
<b>Wood, C&amp;D Subtotal</b>		<b>1.5%</b>	<b>9.8%</b>	<b>2.6%</b>	<b>3.4%</b>	<b>54.5%</b>	<b>68.8%</b>	<b>46.5%</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>Number of Samples</b>		<b>5</b>	<b>8</b>	<b>6</b>	<b>3</b>	<b>16</b>	<b>6</b>	<b>72</b>

All figures are percentages by weight, except for the sample numbers shown in the bottom row.

A few highlights of the data shown in Table 6 include:

- Retail Stores are discarding a large amount of cardboard (25% of their waste), a material that is generally easy to recycle. Although market prices for cardboard are occasionally low, the avoided disposal cost of recycling this material may be sufficient to pay for any additional costs for recycling. There is also a large amount of food waste in this waste stream (42.7%) and, as is the case with grocery stores (see next bullet), a recycling program for this material could make economic sense.
- Grocery Stores generate a substantial amount of food waste (47.6%). A large amount of this material is vegetative wastes that could go directly to a composting facility, but new processing capacity may be needed to handle the portion that is post-consumer food waste or meat and meat-related products. Diverting this material could lead to savings due to avoided disposal costs, which might make it economical for businesses and agencies to implement some level of food waste diversion.
- Schools also generate a substantial amount of food waste (18.6 %), and with education and oversight it could be possible for the schools to separately collect food waste and compostable materials (paper). Schools are also discarding other recyclable materials, such as cardboard, mixed waste paper, glass bottles, aluminum cans, and other metals.
- Thrift Stores are discarding of a large amount of textiles (28.8%), metals (13.1%) and various other recyclable materials. In the past, many thrift stores shipped unusable clothing out of the country for recycling, but it appears that current markets for these materials were poor or non-existent at the time of this study.
- The construction samples show a mixture of expected results, such as the large amount of wood and C&D wastes in all types of samples, and unexpected results, such as the large amount of paper in the samples from new homes and the amount of metal in roofing waste.

## SECTION IV

### CONCLUSIONS AND RECOMMENDATIONS

#### A. INTRODUCTION

This section provides conclusions and recommendations based on the results of this study.

#### B. OPPORTUNITIES FOR ADDITIONAL WASTE DIVERSION

The residents and businesses in Clark County have made significant progress in diverting recyclable resources from the waste stream, but there are still thousands of tons of materials that could be recycled or composted. Table 7 (see next page) examines the amounts of these materials that are currently discarded as garbage. Data in this table is divided into two sections, based on whether a material can be easily recycled through widely available programs, or whether the material could potentially be diverted from the waste stream through a new or expanded collection program.

##### **Recycling Potential for Materials that can be Recycled through Available Programs**

The data in the upper part of Table 7 addresses those materials that are commonly recycled through curbside or commercial collection programs, drop-off centers, and other opportunities that are widely available to residential and commercial customers, and shows the tons of these materials that are currently being discarded instead of being recycled. As shown, there is approximately 59,200 tons of recyclable materials, or 27.4% of the total waste stream, that could have been diverted through available programs. Households and apartments, through garbage collections and self-haul, discarded 32,540 tons of that amount or about 55% of the total. The non-residential sector discarded the other 26,740 tons, or 45% of the total.

This study was conducted in such a manner that in theory 100% of the tonnages shown could have been recycled IF these materials had not been mixed with garbage. Once mixed with garbage, however, much of this material cannot be recycled due to contamination, recovery costs and other problems. In a recent study for Thurston County, for instance, only about one-third of the recyclable materials were judged to be still marketable after being mixed (collected and disposed) with garbage. In other words, floor sorting or other mixed waste processing systems cannot be expected to recover more than a portion of the tonnages shown in Table 7.

Note that the tonnages shown in the upper part of Table 7 are summed up to show the cumulative amount of increased recovery potential through existing programs, based on the assumption that many of the efforts to promote any one of these materials would also increase the recovery of other materials. The figures in the lower part of the table are not summed up based on the assumption that recovery of these materials would require a variety of different programs and efforts.

##### **Recycling/Diversion Potential for New or Expanded Programs**

In the lower part of Table 7, several materials are listed that can already be recycled to some degree (wood, textiles, C&D and plastic packaging), but are listed there because the recycling programs for these materials are not widely available or fully developed. In fact, some of these materials (such as C&D and

**TABLE 7**  
**ADDITIONAL WASTE DIVERSION POTENTIAL BASED ON DISCARDED QUANTITIES**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

<u>Diversion Potential through Widely-Available Programs</u>	<u>Single-Family</u>	<u>Apartment</u>	<u>Residential Self-Haul</u>	<u>Non-Residential Self-Haul</u>	<u>Business</u>	<u>Total Waste Stream</u>
Newspaper	1,620	1,160	530	130	1,190	4,630
Cardboard	1,090	1,090	1,220	1,730	5,080	10,220
Office and Computer	400	160	70	50	1,320	1,990
Mixed Waste Paper	3,110	1,220	810	330	3,530	9,000
Magazines	940	310	430	40	620	2,340
Milk Cartons, Other	210	50	30	70	170	530
Plastic Bottles (1-7)	940	370	240	60	500	2,110
Aluminum Cans	300	180	100	40	220	850
Other Metals	3,080	1,470	3,130	2,360	4,720	14,760
Glass Bottles	2,000	1,100	1,090	240	1,300	5,720
Yard Debris	2,970	670	450	440	2,600	7,130
<b>Subtotal, Additional Recycling Potential through Widely-Available Programs</b>	<b>16,660</b>	<b>7,780</b>	<b>8,100</b>	<b>5,490</b>	<b>21,250</b>	<b>59,280</b>
<u>Diversion Potential through New or Expanded Programs</u>						
C&D (1)	2,410	420	2,070	5,330	5,870	16,090
Carpet	200	410	1,090	2,340	2,060	6,100
Food Waste	14,570	3,170	2,690	500	10,440	31,370
Plastic Packaging	5,530	1,180	1,010	790	6,230	14,730
Textiles	2,200	960	1,210	450	2,680	7,500
Wood Waste (1)	1,850	660	2,900	5,320	7,610	18,350

Notes: All figures are tons per year, and based on a total amount of 216,500 tons.

1. Not all of the materials included in wood waste and C&D wastes are recyclable, but generally 75% or more of these materials could be recycled through existing programs.

wood) are already being recovered by CRC from wastes deposited on the tipping floor of the transfer stations. The figures shown in Table 7, however, indicate that more could be done, and again the additional tonnages would preferably be diverted through source separation programs that maintain the cleanliness of the materials and provide for more effective recovery. The next section of this report addresses the potential for source separation and other programs to divert additional amounts of a few of these materials.

### **Analysis of "Pure Loads"**

Table 8 (on the next page) focuses on three materials (food waste, wood and C&D) and three types of waste generators (businesses and the two types of self-haul). The purpose of this table is to show the extent of "pure loads", or high-percentage loads, of these materials from these sources, as an indication of the feasibility of either source-separation or post-collection processing programs to recycle these materials. If additional recovery programs are considered for these materials, it would make sense to target the loads or waste generators that are the most concentrated sources of these materials.

The results in Table 8 are based on an analysis where each sample (for businesses and the two self-haul generators) was examined to determine the amount of food, wood, and C&D wastes. Results of this examination were grouped by the percentage of the material found, in terms of the number of samples that contained less than 1%, from 1 to 25%, from 26 to 50%, from 51 to 75%, and above 76% of each material. For instance, 33 of the Business samples were found to contain less than 1% food waste, and this is equivalent to 31% of the total number of samples for this waste generator.

Data of particular interest in Table 8 are those loads that are 50% or more of a specific material. For instance, only 1% of the Non-Residential Self-Haul samples contained 26% or more food waste, meaning that few loads (or sources) of this type would be good candidates for recovery of food waste at a central facility or possibly even for a collection program at the source. Businesses are more promising for this material, with 6% of these samples containing 50% or more food waste. For wood, 5% of the Residential Self-Haul, 19% of the Non-Residential Self-Haul and 6% of the Business samples contain 50% or more wood. Loads that are primarily wood are already targeted by CRC crews for recovery through floor sorting.

It should be noted that this analysis is based on the assumptions that each sample is representative of the load from which it was taken and that the loads are representative of the source (since this data is intended to indicate how much of a material is generated in a concentrated form that can easily be separated for recycling).

## **C. RECOMMENDATIONS**

The primary conclusion of this study is that there are large additional amounts of materials that could be diverted from the waste stream through source separation and other programs, but also that significant progress has already been made in diverting several of the materials.

The following conclusions and recommendations are based on the results of this study:

- The estimated 59,200 tons (27.4%) of easily-recycled materials that are discarded demonstrates the need for additional public education efforts. These efforts should be prioritized based on the quantities of the recyclable materials being disposed and the source.



**TABLE 8**  
**ANALYSIS OF POTENTIAL WASTE DIVERSION BY SAMPLE**  
**CLARK COUNTY 1999 WASTE STREAM ANALYSIS**

	<u>Residential Self-Haul</u>		<u>Non-Residential Self-Haul</u>		<u>Businesses</u>	
	<u>Number of Samples</u>	<u>Percent of All Samples</u>	<u>Number of Samples</u>	<u>Percent of All Samples</u>	<u>Number of Samples</u>	<u>Percent of All Samples</u>
<u>Food, Amount in Load</u>	27	28%	75	75%	33	31%
	57	59%	24	24%	52	49%
	11	11%	1	1%	15	14%
	1	1%	0	0%	4	4%
	0	0%	0	0%	2	2%
	96		100		106	
<u>Wood, Amount in Load</u>	39	41%	33	33%	43	41%
	40	42%	35	35%	50	47%
	12	13%	13	13%	5	5%
	2	2%	13	13%	7	7%
	3	3%	6	6%	1	1%
	96		100		106	
<u>C&amp;D, Amount in Load</u>	58	60%	39	39%	62	58%
	30	31%	26	26%	35	33%
	4	4%	16	16%	3	3%
	1	1%	12	12%	5	5%
	3	3%	7	7%	1	1%
	96		100		106	

Notes: The above figures show the number of samples that contained the specified amount of each material, as an indication of recycling feasibility.

- Food waste represents 14.5% of the entire waste stream or 31,400 tons per year. Diverting food waste could lead to a significant reduction in the County's total waste stream and could recover a large amount of valuable resources (redistribution of food to the needy, animal feed, and nutrients and organic matter for soil improvement). Unfortunately, collecting this material can be difficult and expensive because the food waste from residential sources is generally contaminated with a variety of other materials (such as plastic) that would increase processing expenses and/or decrease the value of the end product. Hence, initial efforts should target food wastes generated in quantity by non-residential sources that can be more easily identified and source separated for recovery. It is estimated that between 20 and 33% of the food waste discarded by Business generators could be recovered through such a targeted program. A collection program should be considered for food waste. The County should consider developing a collection program for food waste.
- Waste reduction is critical to conserving resources and reducing pollution, and could help address the remaining part of the waste stream that is currently "garbage" (i.e., non-recyclable). County programs should continue to encourage residents and businesses to consider reducing and reusing waste materials, and local industries should be encouraged to design products with recycling and sustainability in mind.
- Education programs should continue to promote proper handling of hazardous and moderate-risk wastes.
- Recent advances in recycling plastic packaging could divert a substantial portion of this material, especially if new collection programs could be established to target the large amounts of this material discarded by Business and Single-Family Home waste generators (together, these sources discard 80% of the plastic packaging). Collection programs should be considered for this material, and the County should continue to watch for similar opportunities with other materials.



# GLOSSARY

## INTRODUCTION

This section defines two sets of terms:

- a) general terms, consisting primarily of technical terms and acronyms used in this report, which are shown below in alphabetical order, and
- b) waste sorting categories, which are shown in the same order as they appeared on the data collection form used for this study.

## A. GENERAL TERMS

Apartment Waste: waste brought in by garbage haulers from apartment buildings.

Business Waste: waste brought in by garbage haulers from commercial, industrial, and institutional sources.

C&D: construction, demolition and land-clearing wastes.

CRC: Columbia Resource Company.

CTR: Central Transfer and Recycling Center.

Non-Residential Self-Haul Waste: waste brought in by an employee from a business or contractor.

Residential Self-Haul Waste: waste brought in by homeowners and renters from residential sources.

Single-Family Waste: waste brought in by garbage haulers from single-family homes.

Waste Generators: for the purposes of this study, all waste disposed in the County was categorized into one of 5 sources: three types of residential waste generators (single-family, apartment and self-haul) and two types of non-residential waste generators (self-haul and business).

West Van: West Van Material Recovery Center.

## B. WASTE SORTING CATEGORIES

### PAPER

Newspaper: printed groundwood newsprint, including glossy ads and Sunday edition magazines that are delivered with the newspaper (unless these were found separately during sorting).

Cardboard: unwaxed kraft paper corrugated containers and boxes, unless poly- or foil-laminated. Note that this category included brown kraft paper bags.

Office and Computer Paper: high-grade white or light-colored bond and copy machine papers and envelopes, and continuous-feed computer printouts and forms of all types, except multiple-copy carbonless paper.

Mixed Waste Paper (MWP): low-grade recyclable papers, including colored papers, notebook or other lined paper, envelopes with plastic windows, non-corrugated paperboard, carbonless copy paper, egg cartons, and junk mail.

Magazines: magazines, catalogs and similar products with glossy paper.

Milk Cartons and Other Aseptic Containers: milk cartons and similar gable-top containers (such as orange juice cartons), and juice drink boxes.

Non-Recyclable Paper: contaminated papers and non-recyclable types of papers such as carbon paper, tissues, paper towels, paper plates, waxed papers, frozen food containers, paper packaging with metal or plastic parts, and hardcover books.

## **PLASTIC**

PET Bottles: polyethylene terephthalate (PET) bottles, with or without the base cup, including soda, oil, liquor and other types of bottles. No attempt was made to remove base cups, caps, or wrappers, although these materials were categorized separately if received separately. The SPI code for PET is 1.

HDPE Bottles: high density polyethylene (HDPE) milk, juice, detergent, and other bottles. The SPI code for HDPE is 2.

Bottles Types 3 - 7: all bottles that were not PET or HDPE, where the neck of the container was narrower than the body. Includes SPI codes 3 - 7.

Plastic Packaging: all plastic packaging films, and shipping materials and other plastic items which were not themselves finished consumer products, including thermoplastics and thermosetting plastics used for packaging.

Other Plastic Products: finished plastic products such as toys, toothbrushes, vinyl hose and shower curtains, including non-C&D fiberglass resin products and materials (see "fiberglass insulation" and "other fiberglass" under C&D Wastes, below).

Expanded Polystyrene: packaging and finished products made of expanded polystyrene. The SPI code for polystyrene (PS) is 6.

## **METAL**

Aluminum Cans: aluminum beverage cans.

Aluminum Foil: aluminum foil and food trays.

Tin Cans: tin-coated steel food containers. This category includes bi-metal beverage cans, but not paint cans or other types of cans.

Mixed Metals/Materials: small appliances, motors, insulated wire and finished products containing a mixture of metals and/or other materials, but which are greater than 50% metal.

Ferrous Metals: products and pieces made from metal to which a magnet will adhere (but including stainless steel), and which are not significantly contaminated with other metals or materials (in the latter case, the item will instead be included under "mixed metals/materials"). This category includes paint and other non-food "tin cans".

White Goods: large household appliances or parts thereof. Special note was taken if any of these still contained refrigerant.

Non-Ferrous Metals: metallic products and pieces not derived from iron (i.e., to which a magnet would not adhere) and which were not significantly contaminated with other metals or materials (in the latter case, the item was instead included under "mixed metals/materials").

Aerosol Cans: metal cans used for containing and applying products under pressure. If the can was full or partially full, with the contents making up more than 25% of the total weight, it was categorized according to the contents.

Electronics: medium-sized household appliances (or parts thereof, such as circuit boards and other electronic components), including computers, televisions, microwave ovens and similar products.

## **SPECIAL WASTES**

Latex Paint: water-based paints.

Oil-Based Paint: solvent-based paints.

Solvents: includes chlorinated or flammable solvents, paint strippers, solvents contaminated with other products such as paints, degreasers, other cleaners if the primary ingredient is a solvent, and alcohols such as methanol and isopropanol. Alcoholic beverages (ethanol) originally intended for human consumption were included under "food waste" or categorized based on the type of container if empty.

Adhesives and Glues: glues and adhesives of various sorts, including rubber cement, wood putty, glazing and spackling compounds, caulking compounds, grout, and joint fillers.

Cleaners and Corrosives: includes various acids and bases whose primary purpose is to clean surfaces, unclog drains, and perform other functions.

Medical Waste: wastes related to medical activities, including syringes, IV tubing, bandages, medications, and other wastes, and not restricted to just those wastes typically classified as pathogenic or infectious.

Motor Oil, Other: used or new lubricating oils and oil filters, primarily those used in cars but possibly also including other materials with similar characteristics.

Oil Filters: used oil filters, primarily those used in cars but possibly including similar filters from other applications.

Gasoline and Fuel Oil: gasoline, diesel fuel and light fuel oils, such as those used for home heating (the heavier oils sometimes used by industry, that require pre-heating before ignition, would be classified as "motor oil").

Antifreeze: automobile and other antifreeze mixtures based on ethylene or propylene glycol, also brake and other fluids if based on these compounds.

Other Automotive Maintenance: other products used for automobile maintenance, generally of a non-hazardous nature, such as car wax, polishes, autobody fillers, etc.

Car Batteries: car, motorcycle, and other lead-acid batteries used for motorized vehicles.

Household Batteries: batteries of various sizes and types, as commonly used in households.

Animal Excrement: feces and associated wastes from animals, such as bags of used kitty litter.

Animal Carcasses: carcasses of small animals and pieces of larger animals unless the item was the result of food preparation. For instance, fish or chicken entrails and raw, plucked chickens were typically classified as food, not as an animal carcass.

Gas Cylinders: pressurized gas cylinders with the contents making up more than 25% of the total weight (if less than 25% or empty, these were categorized as metal).

Pesticides and Herbicides: includes a variety of poisons whose purpose is to discourage or kill pests, weeds or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, were also included in this category.

Fertilizers with Pesticides/Herbicides: fertilizers that contain weed killer or other ingredients designed to eliminate weeds and/or pests.

Fertilizers without Pesticides/Herbicides: fertilizers without herbicide or pesticide additives.

Other Hazardous and Special Waste: problem wastes that did not fall into one of the above categories, such as asbestos-containing wastes (if this is the primary hazard associated with the waste), gunpowder, unspent ammunition, and radioactive materials.

Actual Hazardous Wastes: select wastes from the above subcategories that are actually classified as hazardous, including wastes that are flammable, corrosive, toxic, explosive (excluding fireworks) or have other hazardous characteristics, and including motor oil, fertilizers (with or without pesticides) and antifreeze. This subcategory does not include oil filters or florescent bulbs. Examples of specific materials that were classified as hazardous wastes include oil-based paint (if not dried out), most solvents, a few of the materials measured as adhesives or cleaners (if the material was flammable or corrosive), and other materials from other categories shown above.

## **ORGANICS**

Food Waste: food waste and scraps, including bones, rinds, etc., and including the food container when the container weight was not appreciable compared to the food inside.

Yard Debris: grass clippings, leaves, weeds and other garden wastes, and prunings four inches or less in diameter.

## **GLASS**

Clear, Green and Brown Glass Containers: three separate categories for bottles and jars that are clear, green or brown in color. Note that any blue glass found was included with brown glass.

Non-Recyclable Glass: window glass, light bulbs, glassware, mirrors, and other glass which was not recyclable. 'Ceramics were not included here but were placed under "miscellaneous inorganics".'

## **OTHER WASTES**

Tires: vehicle tires of all types, including bicycle tires and rims if present.

Rubber Products: finished products and scrap materials made of rubber, such as bath mats, inner tubes, rubber hose and foam rubber (except carpet padding, which was included with "carpet").

Cosmetics and Other Health Care Products: includes bottles and other containers of health care products (cosmetics, shampoo, other hair care products, and other health care products, except vitamins which were placed with "food waste" and drugs, which were placed with "medical waste"), where the weight of the product was greater than the weight of the container (i.e., the product was greater than 50% of the total weight of the item).

Disposable Diapers: disposable baby diapers and protective undergarments for adults (including feminine hygiene products).

Textiles: cloth, clothing, rope, tennis shoes, and rubberized cloth.

Carpet: pieces of carpeting, and foam rubber and other materials used as padding under carpets.

Leather: scraps of leather and finished products such as shoes.

Furniture and Mattresses: furniture and mattresses made of various materials.

Inert Material and Fines: material less than one-half inch in diameter that fell through the bottom screen during sorting.

Ash and Dust: fireplace, burn barrel or firepit ash, as well as bags of vacuum cleaner dust.

Miscellaneous Organics: mixed waste that remained on the sorting table after all the materials that could practicably be removed had been sorted out. This material consisted primarily of small pieces of various types of paper and plastic, but also contained small pieces of broken glass and other materials. Pieces of wax were also included in this category.

Miscellaneous Inorganics: miscellaneous inorganic materials, such as ceramic products, that were sorted out of the sample but that did not fit into another category.

## **WOOD WASTES**

Dimension Lumber: wood commonly used in construction for framing and related uses, including 2 x 4's and 2 x 6's.

Pallets: partial or whole pallets and similar shipping containers.

Treated Wood: wood treated with preservatives such as creosote, including dimension lumber if treated. Did not include painted or varnished wood. This category may also include some plywood (especially "marine plywood"), strandboard, and other wood.

Roofing: wood that is commonly used for roofing of buildings, such as cedar shingles or shakes. Note that roofing made from non-wood materials was classified as C&D (see "roofing wastes" under C&D).



Contaminated Wood: material that was contaminated with other wastes in such a way that they could not be easily separated, but consisted primarily (over 50%) of wood. Examples include wood with sheetrock nailed to it or with tiles glued to it.

Stumps and Other Bulky Wood: tree and shrub stumps, with the adhering soil (if any) and other natural woods, such as logs and branches, in excess of four inches in diameter.

Plywood: a wood product built up of two or more veneer sheets glued or cemented together under pressure.

Particle Board / Fiberboard: building material made up of various fibers or chips (but typically made from wood chips) pressed together to form large sheets or boards.

Wood Products: goods and products fabricated primarily (over 80% by weight) from wood, including toys, household items, and similar goods. Does not include building materials or furniture.

Other Wood Waste: other types of wood that did not fit into the above categories.

## **CONSTRUCTION, DEMOLITION AND LAND CLEARING (C&D) WASTES**

Ceramics, Porcelain, and China: used toilets and sinks. Note that non-C&D ceramics, such as plates and other dishes, were categorized under "miscellaneous inorganics".

Rocks and Brick: rock, gravel, and bricks of various types and sizes.

Concrete: cement (mixed or unmixed), concrete blocks, and similar wastes.

Soil, Dirt, and Non-Distinct Fines: includes soil, sand, dirt and similar materials, that could be recovered separately from the fines measured as part of the normal sorting procedure.

Gypsum Board: used or new gypsum wallboard, sheetrock or drywall present in recoverable amounts or pieces (generally any piece larger than two inches square was recovered from the sample).

Fiberglass Insulation: does not include other types of insulation or other fiberglass products.

Other Fiberglass: other fiberglass products, such as shower stalls and bath tubs.

Roofing Waste: asphalt and fiberglass shingles, tar paper, and similar wastes from demolition or installation of roofs. Does not include cedar shingle or shakes (see wood subcategory, "roofing wood").

Asphalt: restricted to asphalt paving material.

Other C&D: construction and demolition wastes that are not included in the above categories.

